US008654095B1

(12) **United States Patent**
Cho et al.

(10) **Patent No.: US 8,654,095 B1**
(45) **Date of Patent: Feb. 18, 2014**

(54) **FOLDABLE DISPLAY DEVICE PROVIDING ADAPTIVE TOUCH SENSITIVE AREA AND METHOD FOR CONTROLLING THE SAME**

(71) Applicant: **LG Electronics Inc.**, Seoul (KR)

(72) Inventors: **Eunhyung Cho**, Seoul (KR); **Sinae Chun**, Seoul (KR); **Jihwan Kim**, Seoul (KR)

(73) Assignee: **LG Electronics Inc.**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **13/918,224**

(22) Filed: **Jun. 14, 2013**

Related U.S. Application Data

(60) Provisional application No. 61/803,758, filed on Mar. 20, 2013.

(30) **Foreign Application Priority Data**

May 20, 2013 (KR) 10-2013-0056757

(51) **Int. Cl.**
G06F 3/041 (2006.01)

(52) **U.S. Cl.**
USPC **345/173**

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2004/0008191	A1 *	1/2004	Poupyrev et al.	345/184
2008/0291225	A1	11/2008	Arneson	
2008/0303782	A1 *	12/2008	Grant et al.	345/156
2009/0174679	A1	7/2009	Westerman	
2010/0117975	A1	5/2010	Cho	
2010/0182265	A1 *	7/2010	Kim et al.	345/173
2010/0251112	A1	9/2010	Hinckley et al.	
2012/0235894	A1 *	9/2012	Phillips	345/156
2012/0262367	A1	10/2012	Chiu et al.	
2012/0262407	A1	10/2012	Hinckley et al.	
2013/0033434	A1	2/2013	Richardson et al.	
2013/0120239	A1 *	5/2013	Suzuki et al.	345/156

FOREIGN PATENT DOCUMENTS

EP 2 500 898 A1 9/2012

* cited by examiner

Primary Examiner — Nicholas Lee
(74) *Attorney, Agent, or Firm* — Birch, Stewart, Kolasch & Birch, LLP

(57) **ABSTRACT**

A method for controlling a foldable display device includes detecting a state of a foldable display unit, the foldable display unit being in a folded state when the foldable display device is folded and being in an unfolded state when the foldable display device is unfolded, and the foldable display unit being divided into a first area which is a border area, a second area which is a folding area and a third area located between the first area and the second area, deactivating touch sensor units of the first area and the second area and activating a touch sensor unit of the third area, if the foldable display unit is in the folded state, and deactivating the touch sensor unit of the first area and activating the touch sensor units of the second area and the third area, if the foldable display unit is in the unfolded state.

21 Claims, 9 Drawing Sheets